

SUNSHINE IS FREE

How sunlight can help supply heat and light for our homes.



by Merle Kindred

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Text: Merle Kindred

Illustrations: Students from Hancock Elementary School

Printed by Designotype Printers, Inc., Houghton, MI

ACKNOWLEDGEMENTS:

Special thanks to the State of Michigan for awarding a Five Star Home Grant for energy efficient design to the Kindreds, which included a marketing budget that helped provide funding for the publishing of this book as well as the upper elementary version, Sun Power.

Also thanks to Mr. Ed Longenecker, Principal of Hancock Elementary School; Mrs. Robin Orr, President of the Parent Teacher Organization; Mrs. Viive Morin, art teacher at Hancock Elementary; and all the students and parents who have so enthusiastically supported this project.

Thanks also to the Community Arts Center in Hancock for displaying in November all the illustrations created for this project to help celebrate October as National Energy Awareness Month.

Thank you to Shawn and Doug Oppliger whose love for the Keweenaw became our love, too. And we thank our grand-daughters (Karen, Ruth, and Louise) whose terrific art work over the years inspired Grandma to use kids' work in these books.

Special thanks to Lola Graves for legal advice and joyous support of this project.

Finally, thank you to Garfield F. (Skip) Kindred, Architect, for his three decades of devotion to passive solar, energy efficient building design. His knowledge is displayed in the Kindreds' new passive solar, super-insulated home in Hancock and in the information distilled into these children's books.

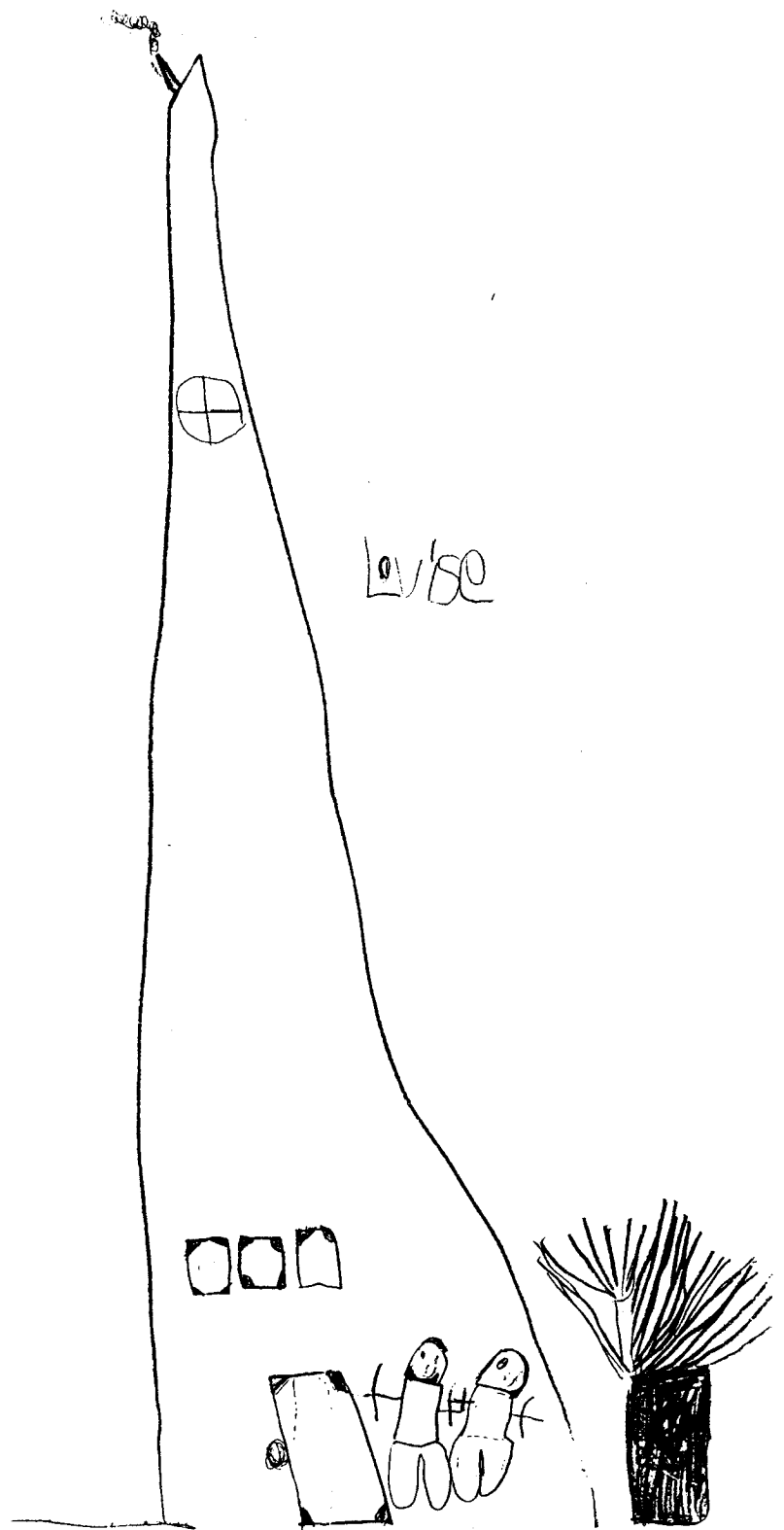
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Cover illustration by Karen Oppliger.

First printing: December, 1998.

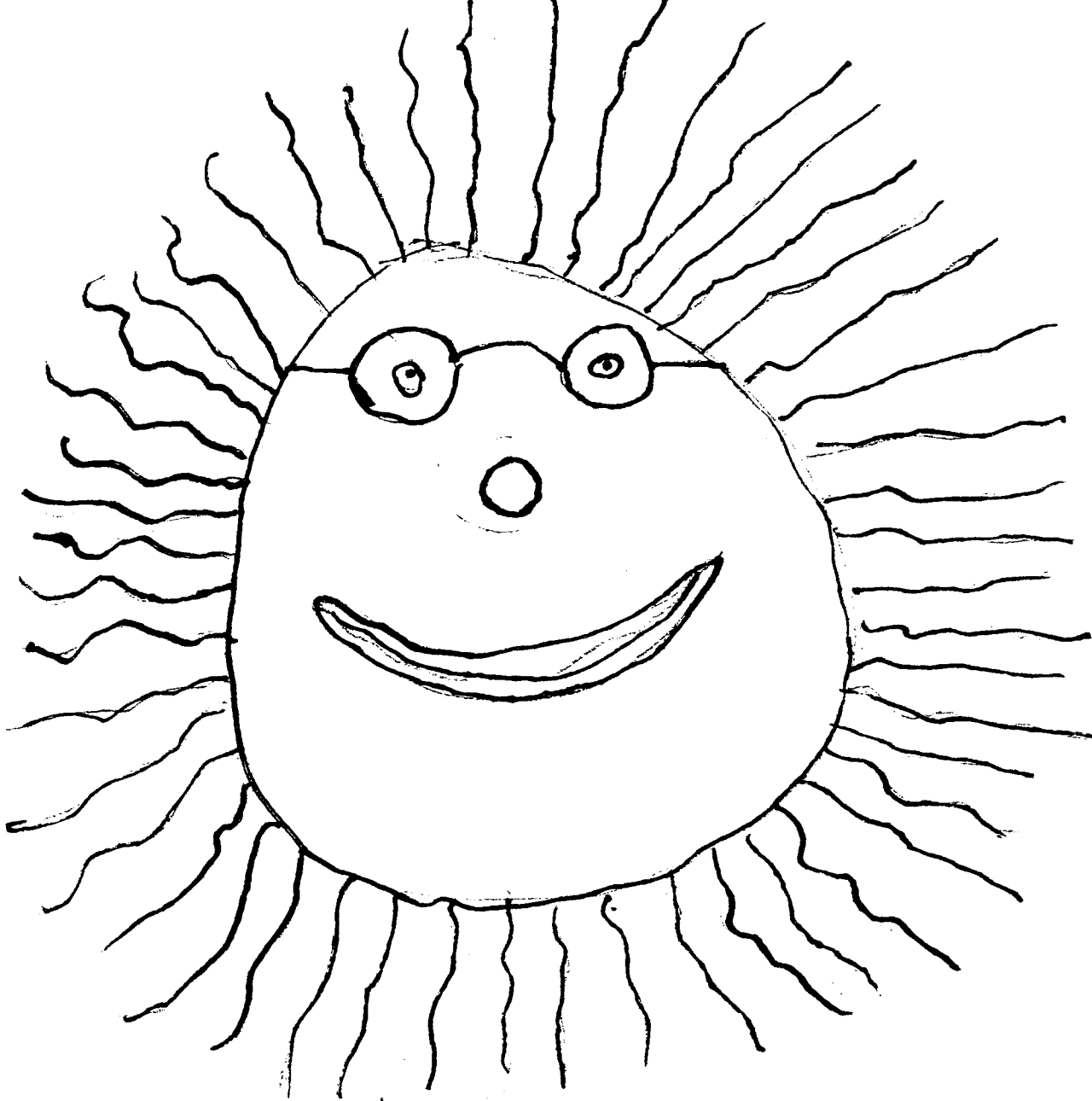
(Book recommended for Kindergarten - grade 3.)



We can think up many wonderful ways to build houses. They can be tall and skinny.



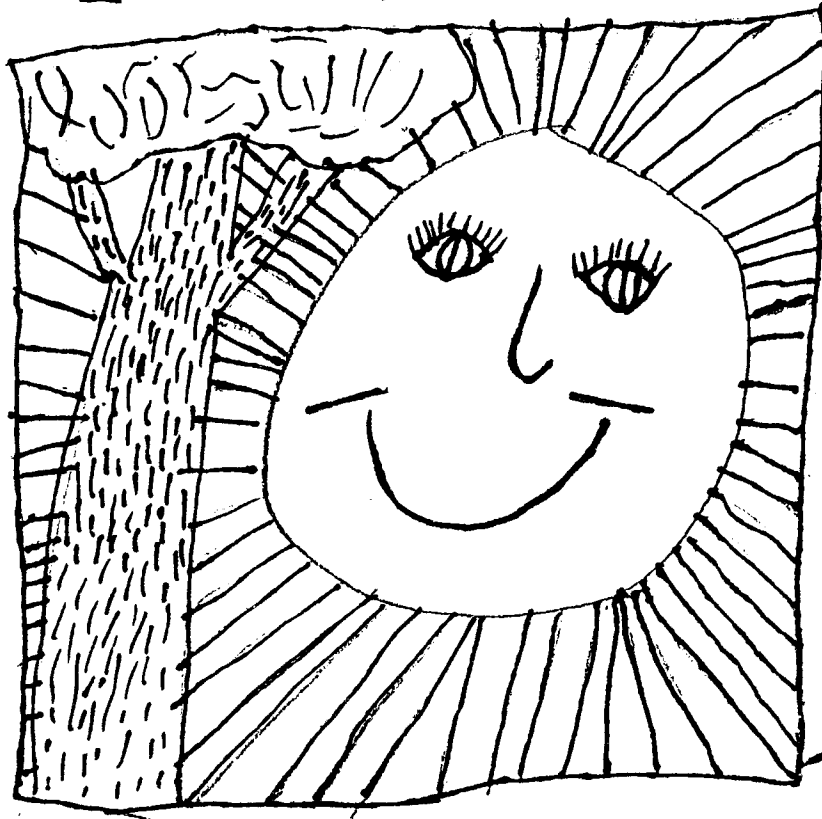
Or the houses in our dreams can be short
and fat.



Jordanna, 2 B
Kero

But when it comes time to build our house, we should think of the sun. That's right - the sun. Sunshine is bright and hot and FREE. We can use it to make our homes cheery and warm.

Laila Maki



Big Windows
on South
and East side

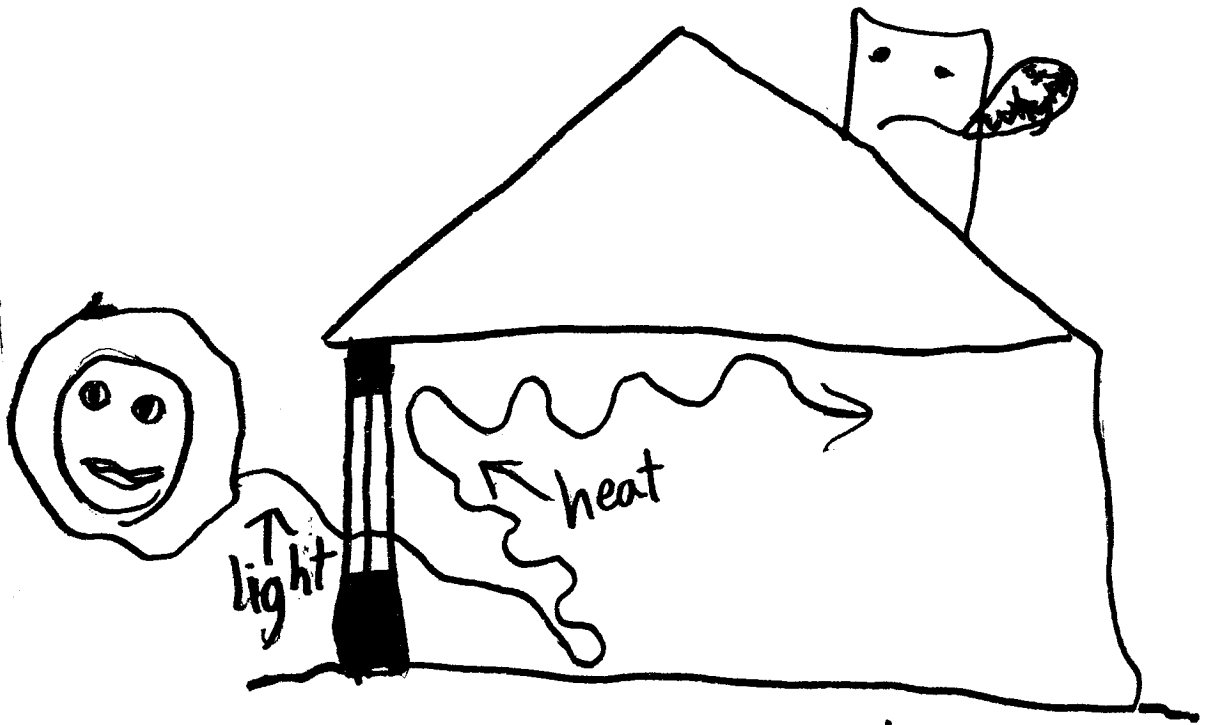
First, we need land where we can get lots of sunshine. Our best sunlight comes from the **south**, where the sun shines from for most of the day. We can also get some good sunlight from the east, where the sun first shows itself in the morning. When we build our house, our big windows should be on the south side and maybe some on the east side of the house.



Sometimes too much sun can come in our house and make it too hot. Let's be sure to have trees around our house. Let's have **deciduous** trees with leaves so the house can have shade in the summer. Then when the leaves fall off in the autumn, we can have lots of sunshine come into our house to warm us in the winter.

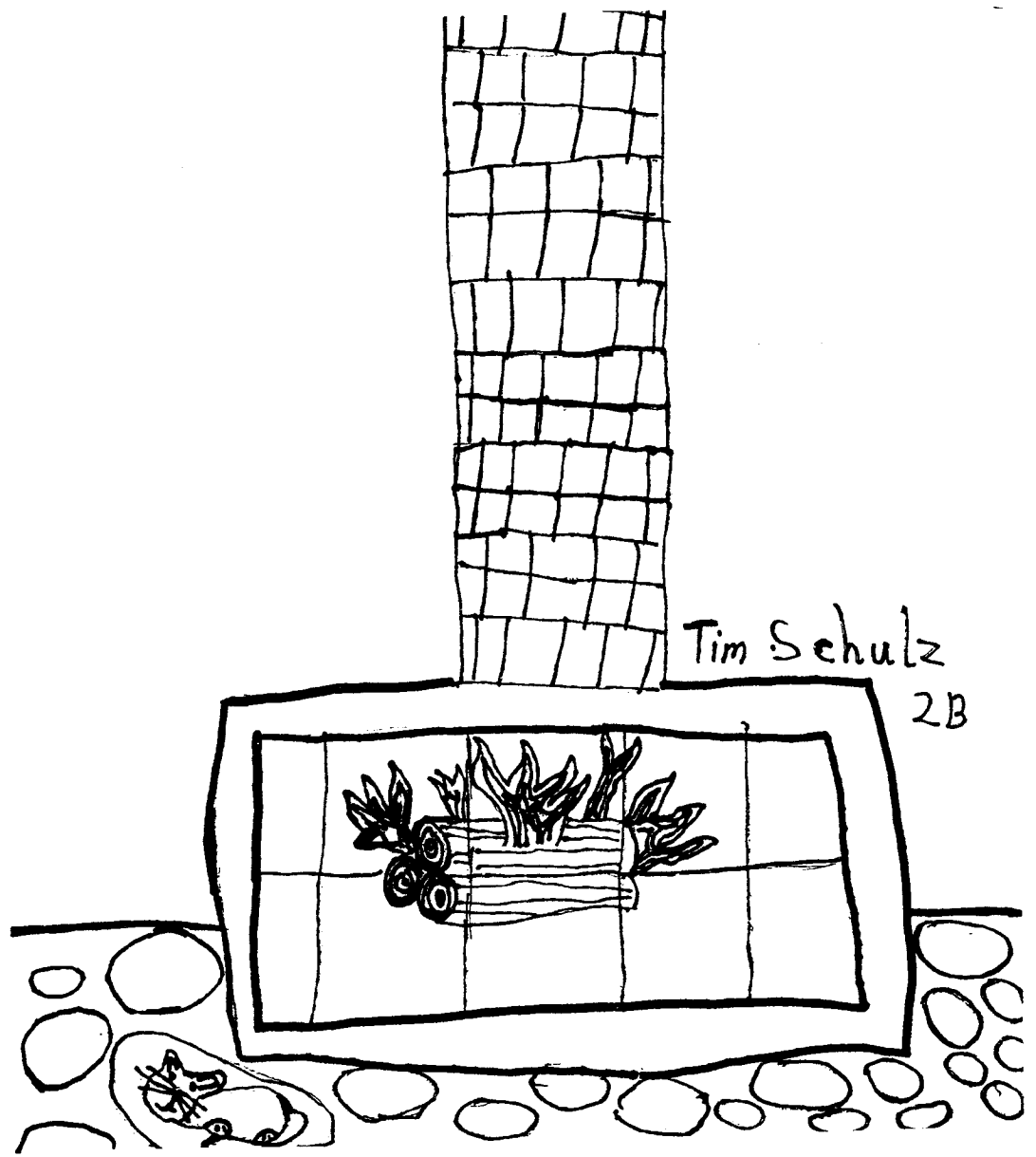


How do we keep warm in winter? We put on layers and layers of clothes to keep our body heat in. To help keep our house warm in winter, we build it with extra thick walls and put extra stuffing called **insulation** in the walls and over the ceiling and under the floors to help keep the heat inside. This insulation is just like putting on extra clothes.



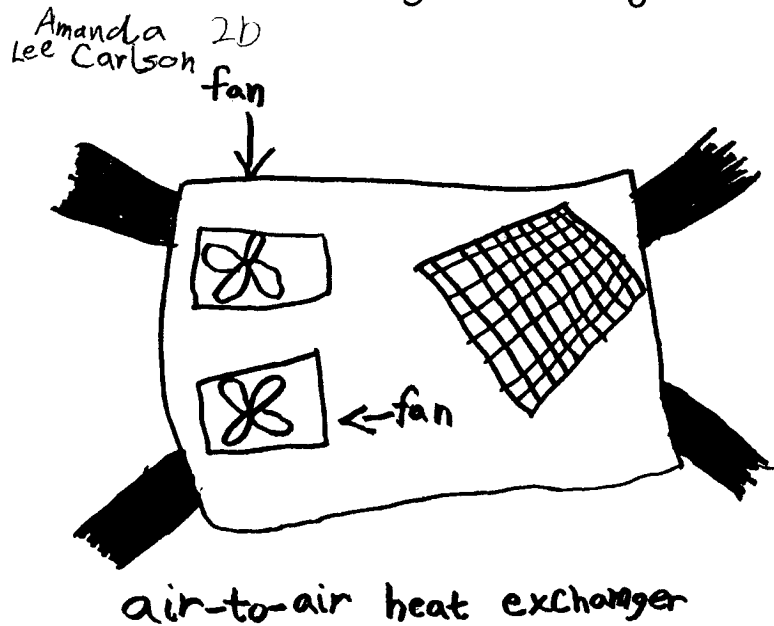
Karen Oppliger

We also use double-pane windows filled with **argon** gas and covered with a special **low-e coating**. These windows let the sunlight into the house where it is converted from light to heat in the ceramic tile, concrete floors, and the inside brick walls. This sunlight is now heat. The low-e coating and the argon gas won't let the heat escape, so our house stays warm.

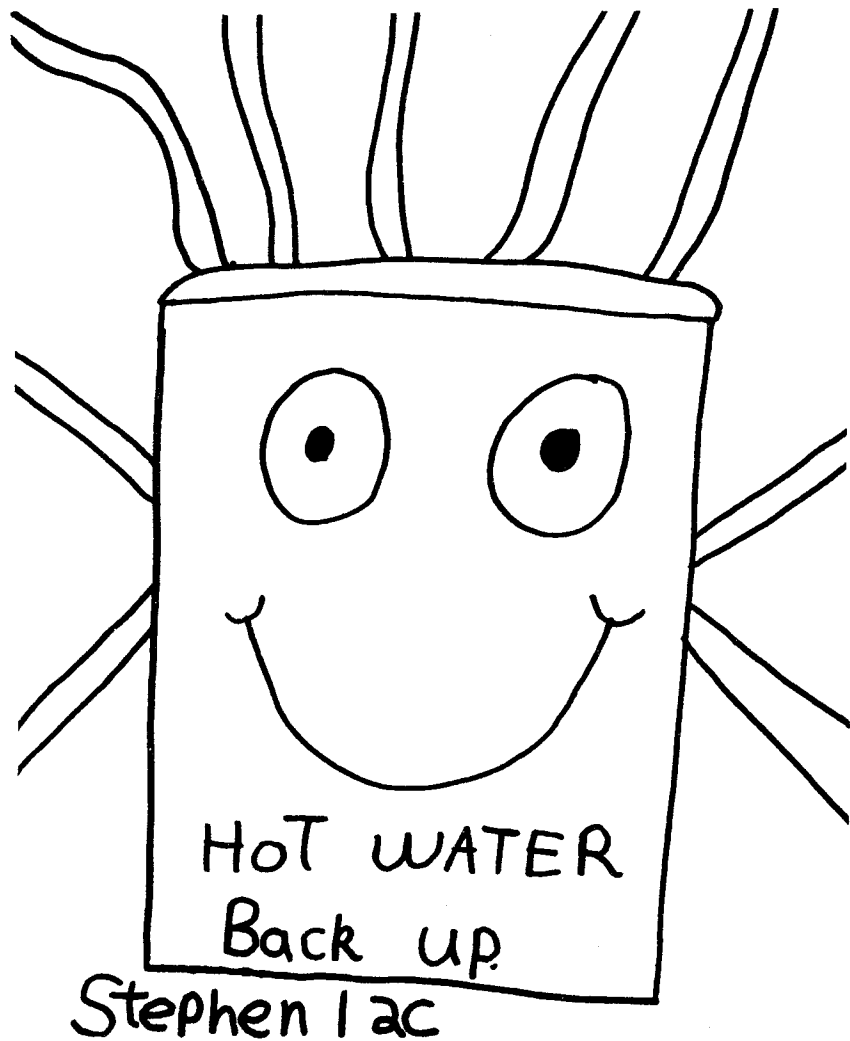


We can have an **energy efficient fireplace** in our house. This fireplace gets the oxygen it needs to burn by using special piping from the outside of the house. It also has tight-fitting glass doors that give off heat while letting us enjoy looking at the burning logs. Special vents around the fireplace direct more heat into our house.

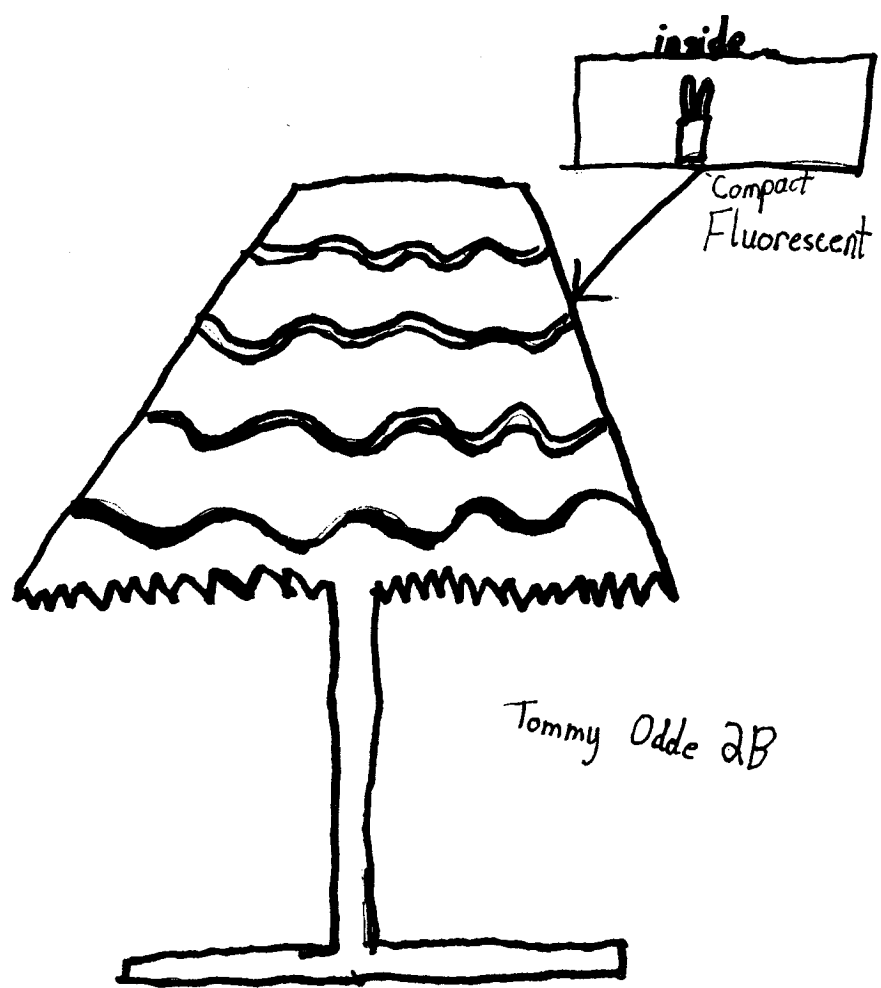
Our house will be all cozy and warm in winter, but we'll also want some fresh air so that the air in our house doesn't get stinky and soggy.



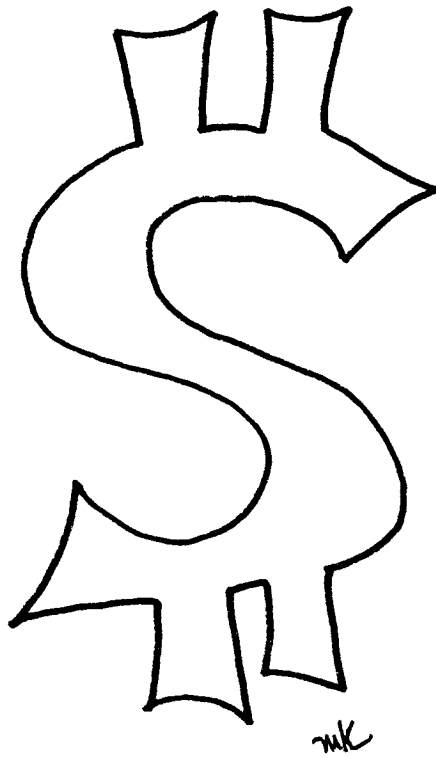
There's a mechanical unit called an **air-to-air heat exchanger**. Pipes called **ductwork** are run behind the walls and above the ceiling. Some of this ductwork carries old, smelly, wet, warm air out of the house. The rest of the ductwork carries fresh air from outside into the house. The air-to-air heat exchanger is a box with small fans and an air filter unit. All the ductwork meets at the box where the warm outgoing air helps heat the chilly incoming air. This means our house will still stay nice and warm and dry and have fresh air, too.



Sometimes we don't see the sun for many days. How do we keep warm when we have lots of cloudy weather? The answer is to have a back-up plan. Our solar house can use the water heater with a special piping system along the baseboards where the walls and floors meet. If there's not enough sun to keep the house warm, hot water can come from the water heater and travel through the baseboard heating units to help warm our house.

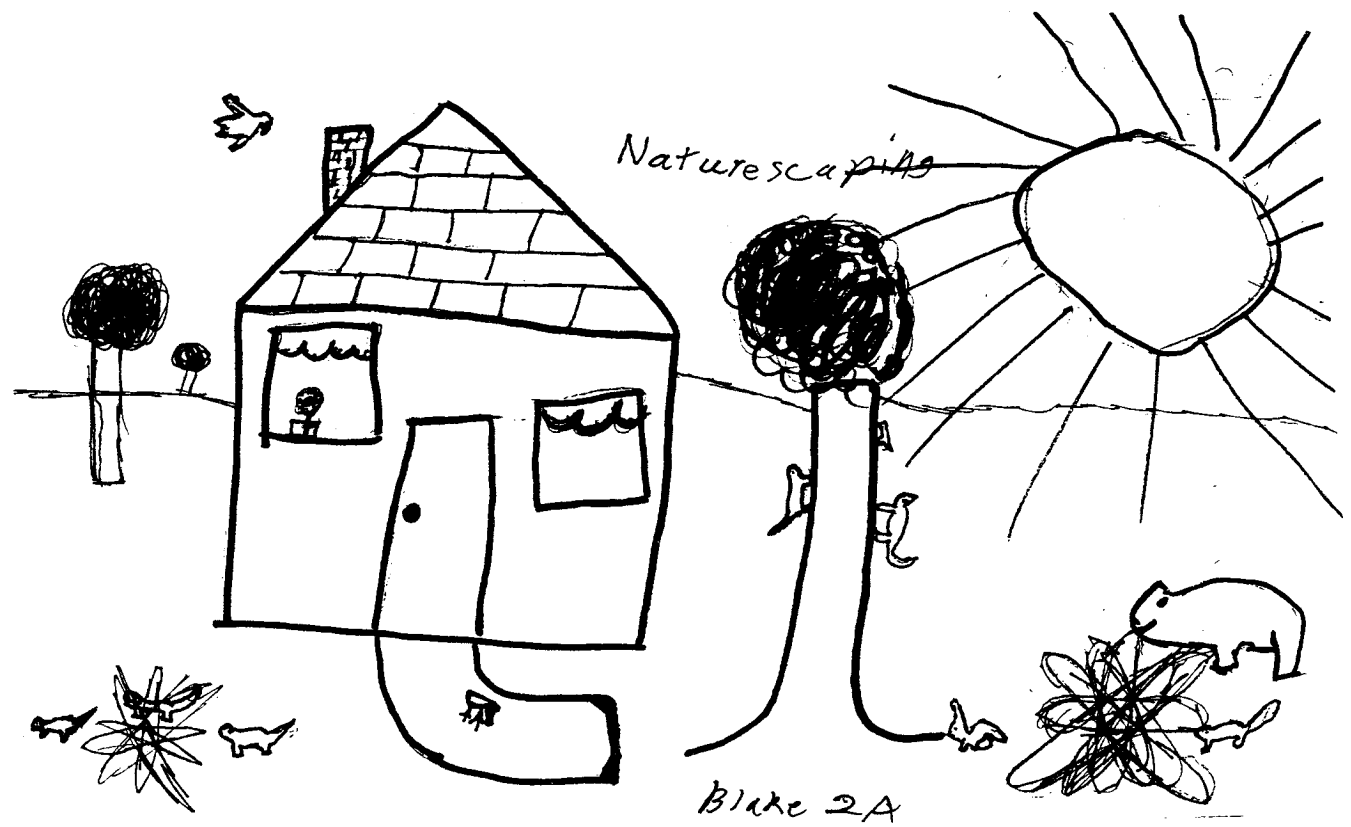


Once our house is built, there are things we can do to help the environment and save money, too. We can buy special light bulbs called **compact fluorescent bulbs** that help save electricity we use for lights. These light bulbs use much less electricity, yet shine as brightly as regular light bulbs. We can also get toilets and shower heads that save water. We can also buy refrigerators and stoves and washing machines and dryers that help save energy.



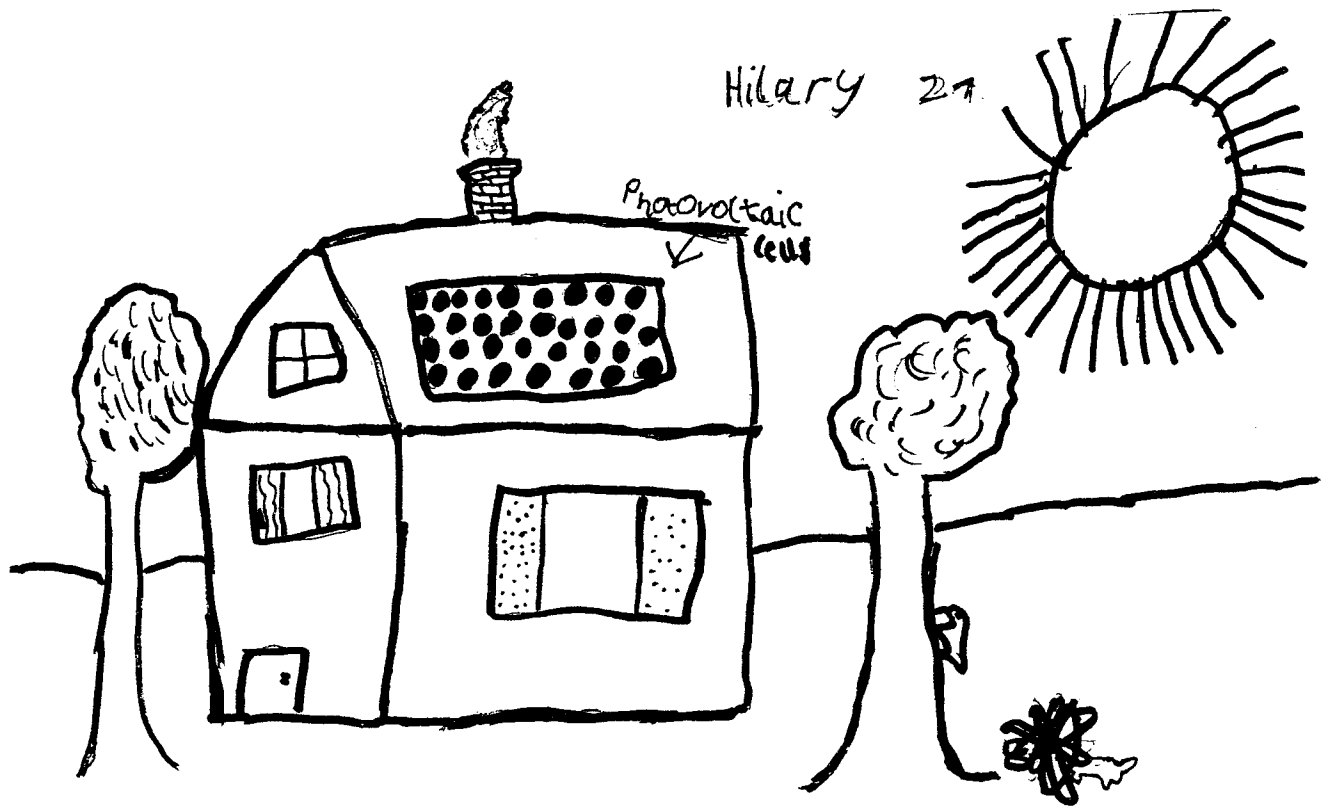
Does this special solar house cost a lot of money? No. If a family can build a regular house, they can also build a solar house for just about the same money.

For every dollar a family spends to build an ordinary house, the family will spend an extra five cents to build the passive solar, super-insulated house we have been describing. But so much energy will be saved operating such an energy efficient house, that after five years, a family will have earned back the extra money they spent on building the house through energy savings. After five years, the house will always cost less to operate.



After we've designed and built our house and filled it with energy saving things, we can also create a yard that is friendly to the environment. Instead of just plain grass, we can let wild grasses, flowers, shrubs, and trees that like to grow naturally just go ahead and fill our yard. This is called **naturescaping**.

We can even put rocks in our yard and let plants grow around them to make rock gardens. We can also build little brush piles with dead twigs and branches that fall from trees and shrubs and make safe homes for little animals like chipmunks and rabbits.

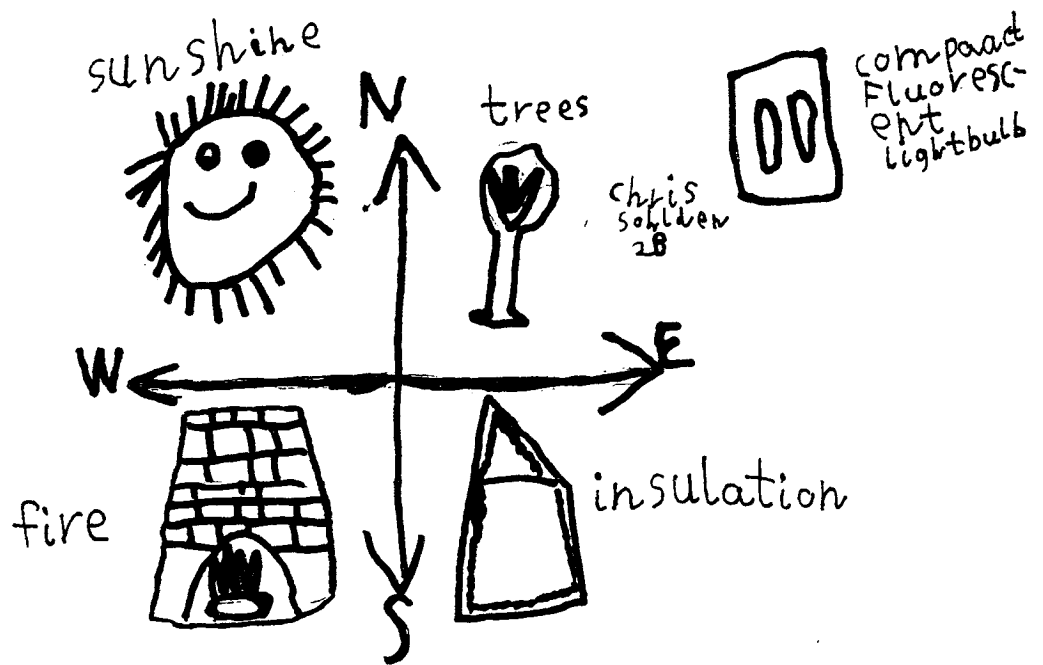


Sometimes the sun can be used to help create electricity for use in the home. This is called **photovoltaics**. **Photo** means **light** and **volts** refer to **power**. **Photovoltaics** means **power from light**, in this case -- sunlight. Photovoltaic cells are usually put on roofs where they soak up sunlight and turn it into electricity. This power can be used to run just about anything in the home that uses electricity.



By using sunlight to help warm our homes and by saving as much energy as we can, we can help reduce the **Greenhouse Effect**. When we burn gas, oil, and wood to help keep us warm and provide electricity and run our cars, we are creating CO_2 (carbon dioxide) which goes up into the atmosphere. The CO_2 acts like insulation and won't let heat escape into outer space as it naturally should. This makes the weather too warm and can harm life on Earth.

Our Earth-friendly house will produce only half the CO_2 of a regular house. If everybody thought about reducing the amount of energy they used in everyday life through conservation and solar energy, we could reduce the amount of CO_2 going out into the atmosphere and help reduce the Greenhouse Effect.



Let's review what we've learned about building a house where we'll let the sun shine in:

- First, we must have a piece of land where we can design a house with big south windows.
- Next, we need trees with leaves to shade the house in hot weather.
- We need a house with extra thick insulation in the walls, above the ceiling, and under the floors.

- We also need special windows that let the sunlight into the house and ceramic tile or concrete on the floors and walls to trap the light as it turns into heat.
- We can have a fireplace, but it must be energy efficient so that it really helps heat the home.
- We also need a mechanical system called an air-to-air heat exchanger which helps chilly, incoming air be warmed by stale, outgoing air.
- We can use our water heater for back-up heat.
- We can also use energy saving light bulbs and fixtures that don't use much water.
- We can help the environment by doing naturoscaping: encouraging natural growth.
- We can use photovoltaics to make electricity from sunlight.
- Using less energy can reduce the Greenhouse Effect.

So, letting the sunshine in can give us a bright, warm house. It can also help the environment and save money. Remember, sunshine is FREE!



Illustrators for this book include:

(top row) Amanda Carlson, Jordanna Kero, Tim Schulz, Laila Maki, Karen Oppliger and Chris Sohlden.

(bottom row) Stephen Gemignani, Louise Oppliger, Ruth Oppliger, Hilary Erickson, Blake Erickson, and Tommy Odde.

(not photographed) Ryan Kent and Amber Korpela.



When preparing the application for a Five Star Home Grant for energy efficient housing, Merle Kindred included plans for a book for children on passive solar, super-insulated house design. Energy conservation is becoming an increasingly important issue in our lives and will certainly be an even greater concern in the 21st century when today's children become tomorrow's adults. Two books were created: one for K through gr. 3 and another for gr. 4-6.

Merle Kindred is a former VISTA and CUSO Volunteer and has taught in the Virgin Islands, Jamaica, and the Bahamas. She has also served as a high school teacher and college instructor in Michigan and is Business Coordinator of Garfield Kindred Associates, P.C. Architects based in Hancock, MI. She loves writing and has served as a writing instructor with Baker College Corporate Services based in Auburn Hills, MI.

Additional copies of this book can be ordered for \$5 each (including postage and handling):

checks payable to: Garfield Kindred Associates
1016 Crestwood Dr.
Hancock, MI 49930-1135
phone: 906/482-7803

(Orders of 10 or more copies, \$4 each.)

Also, Sun Power, written for grades 4-6, can be obtained for the same price from the same source.

[NOTE: Half the proceeds of the sale of this first edition of each book will be donated to the Hancock Elementary School art department.]